

### REMARKS

Claims 1-29 are pending in the case, claims 11-18 and 21-22 having been withdrawn from consideration. In the Office Action, the Office rejected:

claims 1-8, 19-20, 23, 25, and 29 as obvious under 35 U.S.C. § 103 (a) by either International Patent Application WO 9706452 ("Bouyoucus I"), U.S. Letters Patent 5,995,452 ("Bouyoucus II") or United States Letters Patent 5,535,176 ("Yang"), in view of U.S. Letters Patent 5,724,306 ("Barr") or U.S. Letters Patent 4,918,668 ("Sallas");

claims 1 and 6-8 as obvious under 35 U.S.C. § 103 (a) by either United States Letters Patent 4,493,061 ("Ray") or United States Letters Patent 4,136,754 ("Manin") in combination with Barr and Sallas;

claims 1 and 6 as obvious under 35 U.S.C. § 103 (a) by United States Letters Patent 4,727,956 ("Huizer") in light of Barr and Sallas;

claims 1-10, 19-20, 23-25, and 29 as obvious under 35 U.S.C. § 103 (a) by UK patent application GB 2,148,503 ("Lugg") with Barr and Sallas;

claims 1-8, 19-20, 23, and 25-29 as obvious under 35 U.S.C. § 103 (a) by United States Letters Patent 4,721,180 ("Haugland *et al.*") in light of Barr and Sallas; and

claims 9-10 and 24 as obvious under 35 U.S.C. § 103 (a) by Bouyoucus (unspecified), Haugland *et al.*, Yang, or United States Letters Patent 5,469,404 ("Barber *et al.*") in view of Lugg.

The Office Action also apparently rejects some unspecified claims Barber *et al.* in combination with Barr and Sallas. Applicants traverse each of the rejections.

#### **I. SUBSTANTIVE FAILURES OF THE REJECTIONS**

Several claims in the case contain limitations that are not disclosed in the prior art. More particularly, the prior art does not disclose (1) varying the single marine vibrator to different depths during a sweep, or (2) determining the preferred depths for the different depths.

**A. NONE OF THE REFERENCES TEACH A SINGLE SOURCE  
AT MULTIPLE DEPTHS DURING A SINGLE SWEEP**

Claims 19 and 25 both recite "varying the depth" of a marine vibrator during a sweep, and claims 20-24 and 26-29 incorporate that limitation by virtue of their dependence from claims 19 and 25. These claims stand rejected as obvious under 35 U.S.C. § 103 (a) by various combinations of art. Although the Office Action rejects these claims, there is no particularized allegation that any of the cited art teaches or suggests this limitation. Applicant's review has produced none.

Applicants therefore respectfully submit that none of the art of record teaches or suggests this limitation. The prior art must disclose each and every element of the claimed invention. *In re Lee*, 61 U.S.P.Q.2d 1430, 1434-35 (Fed. Cir. 2002). The Office has therefore failed to discharge its burden to establish *prima facie* that claims 19-24 and 26-29 are obvious over the art of record.

**B. THE ART OF RECORD FAILS TO TEACH  
THE PREFERRED DEPTH DETERMINATION**

New claim 30 depends from claim 1 and includes a particular depth determination. This claim is a rewrite of claim 11, which has been withdrawn from consideration. However, none of the cited art teaches this depth determination.

**II. CLAIMS 1-8, 19-20, 23, AND 25-29 ARE ALLOWABLE OVER BOUYOUCUS I,**

**BOUYOUCUS II, YANG, RAY, MANIN, HUIZER, HAUGLAND *ET AL.* AND  
BARBER *ET AL.* IN VIEW OF BARR OR SALLAS**

The Office Action rejected claims 1-8, 19-20, 23, 25-29 as obvious under 35 U.S.C. § 103 (a) over varying combinations of primary references in view of either U.S. Letters Patent 5,724,306 ("Barr") or U.S. Letters Patent 4,918,668 ("Sallas"). The primary references include:

- International Patent Application WO 9706452 ("Bouyoucus I"),
- U.S. Letters Patent 5,995,452 ("Bouyoucus II"),<sup>1</sup>
- United States Letters Patent 5,535,176 ("Yang"),
- United States Letters Patent 4,493,061 ("Ray"),
- United States Letters Patent 4,136,754 ("Manin"),
- United States Letters Patent 4,727,956 ("Huizer"),<sup>2</sup>
- United States Letters Patent 4,721,180 ("Haugland *et al.*"), and
- United States Letters Patent 5,469,404 ("Barber *et al.*").

Previously in this case, the Office rejected these claims as anticipated by at least some of these primary references. However, those anticipation rejections failed because, as the Office now concedes, they fail to teach the use of marine seismic sources that produce sweeps. The Office has now made a new rejection predicated on the same references in combination with Barr and Sallas, which do teach marine vibrators. However, the *prima facie* case for this rejection is fatally flawed in a number of respects.

**A. THE REFERENCES ARE IMPROPERLY COMBINED**

<sup>1</sup> Beyonce II is the U.S. Nationalization of Beyonce I under the Patent Cooperation Treaty ("PCT"), and its teachings are at least largely identical.

<sup>2</sup> The present Office Action does not specifically treat this rejection, and thus fails to meet the requirements for the *prima facie* case of obviousness. See *In re Oenker*, 24 U.S.P.Q.2d (BNA) 1443, 1445-46 (Fed. Cir. 1992) (Office's burden to establish obviousness). However, Applicants note that the earlier Office Action "...referred to the PCT search report and International Preliminary Examination Report." The references also fail to meet the Office's burden. Most pertinently, the IPER ("International Preliminary Examination Report") states only that Huizer discloses arrays of airguns as well as other components of a survey, such as a survey vessel, with insufficient particularity. Applicants note that the *prima facie* case also fails for a lack of particularity.

The Office has attempted to remedy the deficiencies of the primary references by combining each of them with either Barr or Sallas. More particularly, Barr and Sallas are used to establish that marine seismic sources that produce sweeps were known to the art, which is omitted from the primary references. Substantively, the Office Action supports the combination as follows:

Therefore, in view of the well known use of air guns and marine vibrators as seismic energy sources in the marine environment, and the preference for marine vibrators over air guns, especially to environmentalists, it would be obvious to one of ordinary skill in the art to substitute a marine vibrator for the air guns of Bouyoucus et al, barber [sic] et al, Yang, Lugg, Manin, Ray, Huizer or Haugland et al.

Detailed Action, p. 4, ¶ 7. However, the *prima facie* case is defective because the references have not been properly combined.

Procedurally, where multiple references are cited, the Office bears the burden of establishing that the references are combinable. *In re Oetiker*, 24 U.S.P.Q.2d (BNA) 1443, 1446 (Fed. Cir. 1992); *In re Fine*, 5 U.S.P.Q.2d (BNA) 1596, 1598 (Fed. Cir. 1988). More particularly:

[A] proper analysis under § 103 requires, inter alia, consideration of two factors: (1) whether the prior art would have suggested to those of ordinary skill in the art that they should make the claimed composition or device, or carry out the claimed process; and (2) whether the prior art would also have revealed that in so making or carrying out, those of ordinary skill would have a reasonable expectation of success. Both the suggestion and the reasonable expectation of success must be founded in the prior art, not in the applicant's disclosure.

*In re Vaeck*, 20 USPQ2d 1438 (Fed. Cir. 1991) (citations omitted); *see also In re Lee*, 61 U.S.P.Q.2d 1430 (Fed. Cir. 2002). Thus, there are at least three major flaws, each fatal, in the Office's *prima facie* case:

the reasoning rests on the irrelevant considerations of ubiquity and environmental favoritism of sweep-type sources;

there is no suggestion for the combination *in the prior art*; and

the Office has failed to demonstrate a "reasonable expectation of success" arising from the combination.

Applicants further develop each of these positions below.

The first error is that the Office's reasoning rests on an irrelevant consideration—ubiquity and "environmental favoritism" are not relevant to the problem facing the inventor. As is clear from Applicants' specification at p. 2, lines 1-9, the invention is directed to ameliorating the interference of ghost signals with the sweep signal during the survey. That marine vibrators are common and are more environmentally favored is irrelevant since the very nature of the invention assumes that marine vibrators, rather than air guns, *etc.*, are already in use. Furthermore, that marine vibrators are common and environmentally favored has no impact on the interference of ghost signals on sweep signals. These ubiquity and "environmental favoritism" considerations are necessarily irrelevant to the problem facing the inventor. Consequently, they cannot support the position that one of ordinary skill in the art would look to them when confronted by the problem addressed by the present invention.

The second error is that the suggestion for combining the references must be based upon a suggestion *in the prior art*. Neither Barr nor Sallas sets forth any *relevant* consideration that would suggest the subject combinations to one of ordinary skill in the art confronted with the problem of ghost signal interference. Applicants' review has found none. The Office has not cited one, either. Any suggestion for the combination therefore must have come from

Applicants' disclosure. Thus, the Office has failed to establish that the references are properly combinable.

The third error is that the Office has failed to demonstrate a "reasonable expectation of success." Even if the other errors are set aside, the Office must establish that the cited art supports some reasonable expectation of success. The Office has failed to identify any teaching in the art that would support any reasonable expectation of successfully mitigating the effects of notch frequencies by substituting common, environmentally favored marine vibrators for the impulse-type sources.

There are other errors in the Office's combination of references, but those listed more than suffice to demonstrate that the primary references are not properly combinable with either Barr or Sallas. The courts have held time and again that "[o]bviousness cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching, suggestion or incentive supporting the combination." *In re Bond*, 910 F.2d at 834, 15 U.S.P.Q.2d at 1568, quoting *Carella v. Starlight Archery and Pro Line Co.*, 804 F.2d 135, 140, 231 U.S.P.Q. (BNA) 644, 647 (Fed. Cir. 1986) (affirming holding of nonobviousness). Thus, even if the references are within the scope and content of the prior art and stand for the propositions for which they are cited, the Office has failed to establish they are properly combinable. The Office has therefore failed to discharge its burden to establish *prima facie* that the claims are obvious under 35 U.S.C. § 103 (a). *In re Oetiker*, 24 U.S.P.Q.2d (BNA) 1443, 1446 (Fed. Cir. 1992); *In re Fine*, 5 U.S.P.Q.2d (BNA) 1596, 1598 (Fed. Cir. 1988).

#### **B. THE REJECTIONS ARISE FROM THE EXERCISE OF HINDSIGHT**

These rejections manifestly arise from the exercise of hindsight. The exercise of hindsight and the lack of a proper suggestion to combine are closely intertwined:

Our case law makes clear that the best defense against the subtle but powerful attraction of a hindsight-based obviousness analysis is rigorous application of the requirement for a showing of the teaching or motivation to combine prior art references. Combining prior art references without evidence of such a suggestion, teaching, or motivation simply takes the inventor's disclosure as a blueprint for piecing together the prior art to defeat patentability--the essence of hindsight.

*In re Dembiczak*, 50 U.S.P.Q.2d (BNA) 1614, 1617 (Fed. Cir. 1999) (citations omitted). "As in all determinations under 35 U.S.C. § 103, the decision-maker must bring judgment to bear. It is impermissible, however, simply to engage in a hindsight reconstruction of the claimed invention, using the applicant's structure as a template and selecting elements from references to fill the gaps." *In re Gorman*, 933 F.2d 982, 18 USPQ2d 1885 (Fed. Cir. 1991).

The impropriety is apparent when one considers each of the references as a whole, as is required by law and policy. The teachings of a prior art reference must be taken as a whole when evaluating obviousness rather than considered in bits and pieces. *Panduit Corp. v. Dennison Mfg. Co.*, 1 U.S.P.Q.2d (BNA) 1593, 1597 (Fed. Cir.), *cert. denied*, — U.S. —, 107 S. Ct. 2187 (1987). "It is well settled that a prior art reference is relevant for *all* that it teaches one of ordinary skill in the art." *In re Fritch*, 23 U.S.P.Q.2d (BNA) 1780, 1782 (Fed. Cir. 1992). None of the primary references teach or suggest that the techniques they disclose are applicable to anything other than impulse-type sources, although some do teach impulse-type sources at varying depths to mitigate the effects of notch frequencies arising from ghost signals.

Furthermore, although Barr and Sallas do teach the use of sweep sources, they teach nothing about mitigating the effects of notch frequencies, *i.e.*:

Barr teaches a technique compensating for imperfect geophone coupling with an ocean bottom cable, *see, e.g.*, col. 1, lines 8-12; and

Sallas teaches a method for suppressing pressure waves propagating in undesired directions, *see, e.g.*, col. 1, lines 7-9.

Thus, these rejections are improper because it would not have been obvious to combine the references "...unless one had in mind the purpose taught by appellant." *In re Stencel*, 828 F.2d 751, 754, 4 U.S.P.Q.2d (BNA) 1071, 1073 (Fed. Cir. 1987) (reversing Board holding of obviousness), *quoting In re Bulloch*, 604 F.2d 1362, 1365, 203 U.S.P.Q. 171, 174 (C.C.P.A. 1979) (additional citations omitted).

**C. THE *PRIMA FACIE* CASE FOR THE REJECTIONS IS THEREFORE DEFICIENT**

The *prima facie* case for the rejections is therefore deficient. First, the Office has failed to establish that the references are properly combinable. Second, the failure to identify a proper suggestion for the combinations establishes that the rejections result from the exercise of hindsight. Accordingly, Applicants respectfully submit that claims 1-8, 19-20, 23, 25, and 29 are allowable over the art of record.

**III. CLAIMS 9-10 AND 24 ARE ALLOWABLE OVER BOUYOUCUS, HAUGLAND *ET AL.*, YANG, OR BARBER *ET AL.* IN VIEW OF LUGG**

The Office Action rejected claims 9-10 and 24 as obvious under 35 U.S.C. § 103 (a) by Bouyoucus (unspecified), Haugland *et al.*, Yang, or United States Letters Patent 5,469,404 ("Barber *et al.*") in view of Lugg. Even if all these references are applicable prior art and are properly combinable, which Applicants do not concede, they still fail to teach all the limitations of the cited claims. More particularly, the references disclose techniques employing sources other than marine vibrators:



- Bouyoucus teaches air guns at, *e.g.* p. 8, lines 1-12; p. 10, line 25 to p. 11, line 3;
- Lugg teaches “non-resonant implosion sources,” *i.e.*, air guns, at, *e.g.*, p. 1, lines 49-72;
- Barber *et al.* teaches air guns at, *e.g.*, the Abstract; col. 3, line 62 – col. 4, line 21; and col. 4, line 61 – col. 5, line 21;
- Yang teaches broadband sources, *i.e.*, air guns and other “non-resonant implosion sources”, at *e.g.*, col. 2, lines 22-39; col. 6, lines 39-49; and
- Haugland *et al.* teaches “source elements” and arrays thereof that are “typically an air gun”, at col. 3, lines 52-57; *see also* col. 5, line 43 to col. 6, line 2.

None of these references teaches anything to do with marine vibrators. Furthermore, the sources they do teach do not generate sweeps.

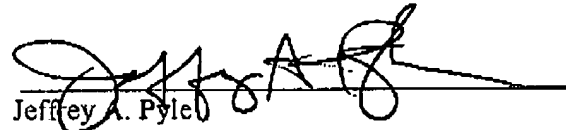
The Office has impliedly conceded this omission by withdrawing the earlier anticipation rejections in light of this argument. Thus, these rejections fail. M.P.E.P. § 706.02(j); *In re Royka*, 490 F.2d 981, 180 U.S.P.Q. 580 (CCPA 1974). Accordingly, Applicants request they be withdrawn.

#### IV. CONCLUDING REMARKS

Applicant respectfully submits that the claims are in condition for allowance and requests that they be allowed to issue.

The Examiner is invited to contact the undersigned attorney at 713-934-4053 with any questions, comments or suggestions relating to the referenced patent application.

Respectfully submitted,



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